RESTRICTED CIRCULATION

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Agricultural Memorandum No. 687

Condensation on Eggs II
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1. Background In Ag. Mem. No. 678, the problem was considered in relation to the dewpoint alone of the ambient air. The incidence of condensation troubles was correctly represented with respect to geographical distribution and the effect of different storage temperatures. However, the seasonal and diurnal variations were not in line with experience. It was suggested that the ambient temperature as well as dewpoint should be considered. When eggs are brought from store into much warmer air, the surface temperature rises rapidly. Therefore, even if the ambient dewpoint is above the storage temperature, condensation may not occur; and if it does, the moisture film may evaporate before organisms have had a chance to multiply significantly in it.

2. Data and Method The same data were used as in Ag. Mem. 678, Plymouth and London Airport (Heathrow) for 1951-70. Observations with dewpoint of 10°C or more were selected. These were further sorted into ranges of air temperature, printed out, expressed as a percentage of all occasions, and displayed graphically.

3. Results The observed pattern of condensation troubles in eggs is one of maxima in spring and autumn, with low incidence in summer. The early morning hours show most occurences, and always troubles are more frequent in the SW than the SE of England. Fig 1, for Plymouth, shows that restricting ambient temperatures to a few degrees over the storage temperature, produces the observed spring and autumn peaks. If the ambient temperature is allowed to have values of 14°C or above, the spring maximum moves forward to early summer, and the summer minimum becomes shallow. Ambient temperature less than or equal to 13°C, with dewpoint greater than or equal to 10°C, are suggested as likely conditions for condensation troubles. The corresponding values for London Airport (not shown in detail) lead to a similar conclusion. Fig 2 shows the seasonal course for the two stations, Plymouth having higher values than London particularly in the spring.

Examination of the pattern of frequencies through the day in individual months, shows that restriction to ambient temperatures less than or equal to 13°C, also produces the desired morning maximum and low mid-day values. This is shown in figs 3, 4 and 5 for May, July and October respectively.

4. Discussion It is suggested that the conditions for condensation to occur on eggs withdrawn from storage at 10°C, are ambient temperature less than or equal to 13°C and dewpoint greater than or equal to 10°C. The evidence is decidedly circumstantial, being based on matching of the observed geographical, seasonal and diurnal patterns of condensation occurence, with patterns of meteorological variables chosen by a modicum of physical argument. Experimental tests of condensation and subsequent decline in quality are needed. It should be remembered that the results of such tests will depend

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not only on the physical characteristics of the eggs, but also on that of the packing, and on the way the packs are bulked for handling.

Any comments or suggestions on this paper should be sent to the author.

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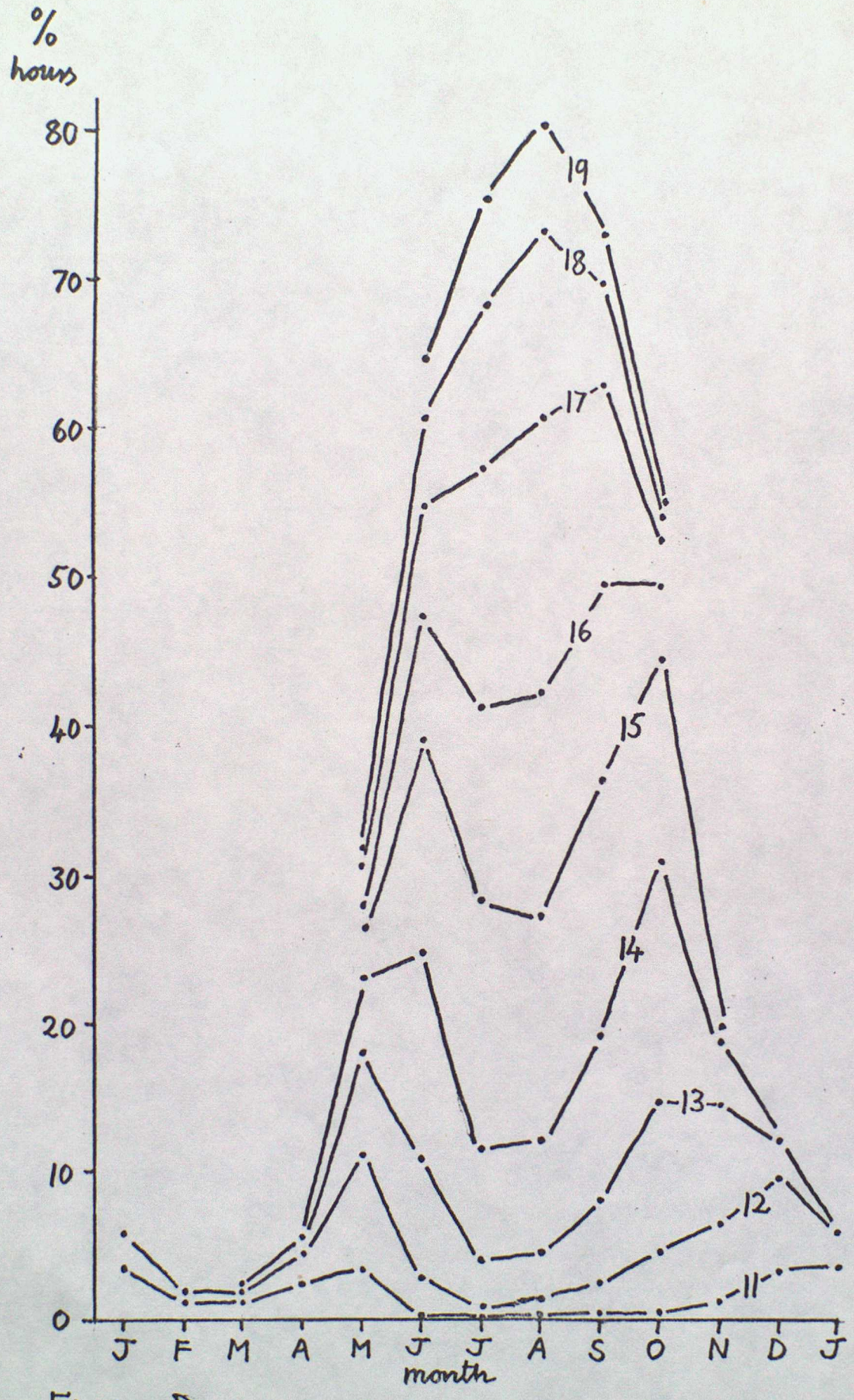

Fig 1. Percentage of all hours 06-21 GMT with dewpoint $\geq 10°C$, and temperature $\leq$ the value given on each curve, at Plymouth.

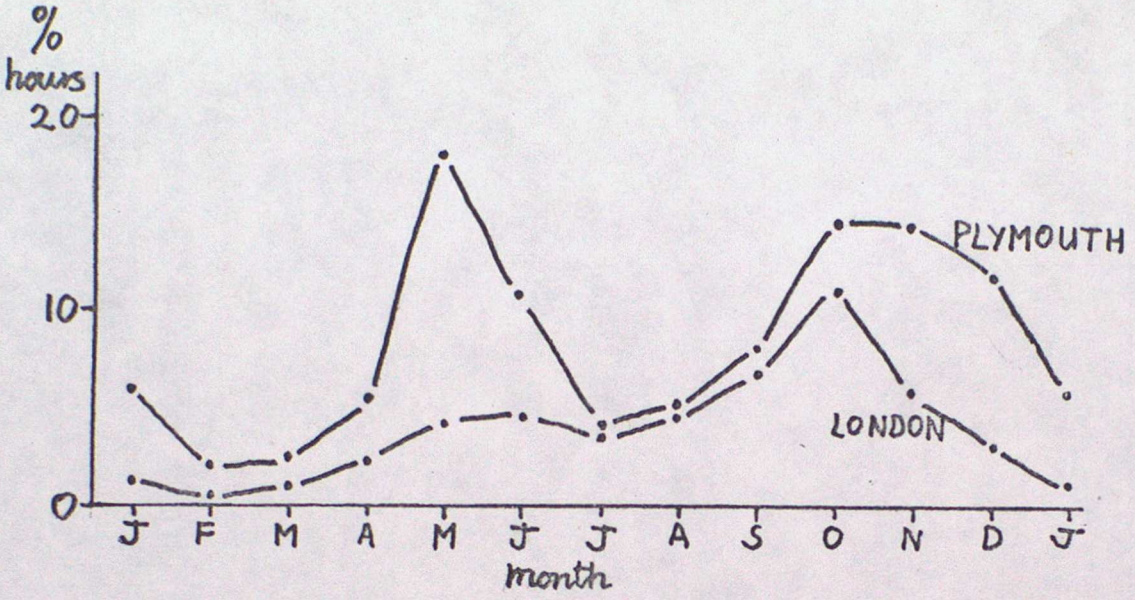

Fig 2. Percentage of all hours 06-21 GMT with dewpoint ≥ 10°C and temperature ≤ 13°C, at Plymouth and London.

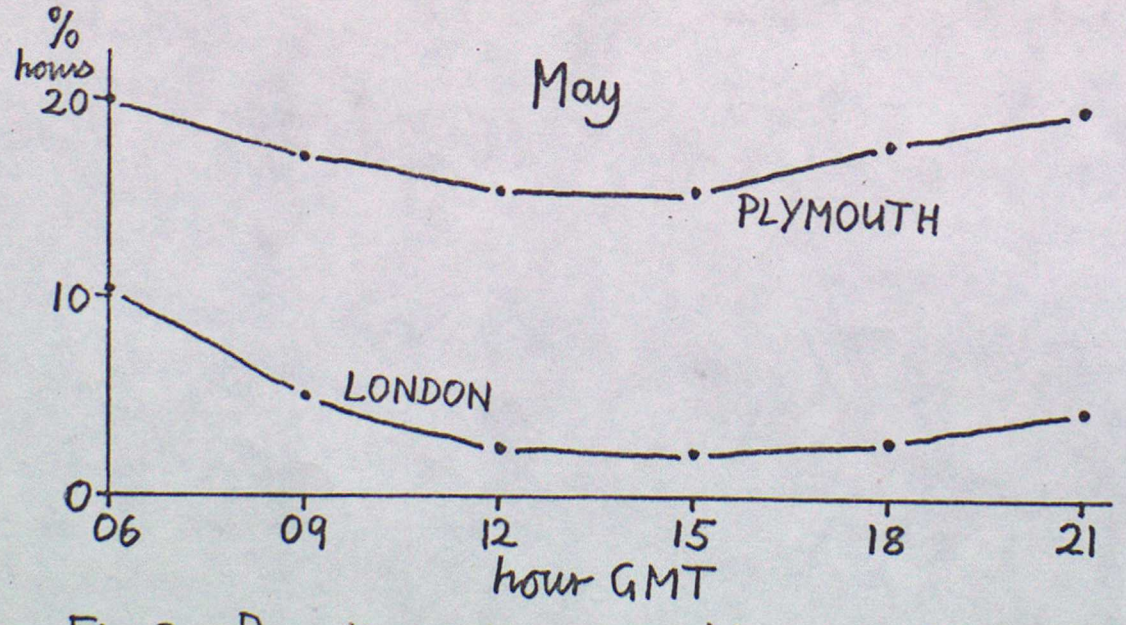

Fig 3. Percentage of hours in May with dewpoint ≥ 10°C and temperatures ≤ 13°C at Plymouth and London.

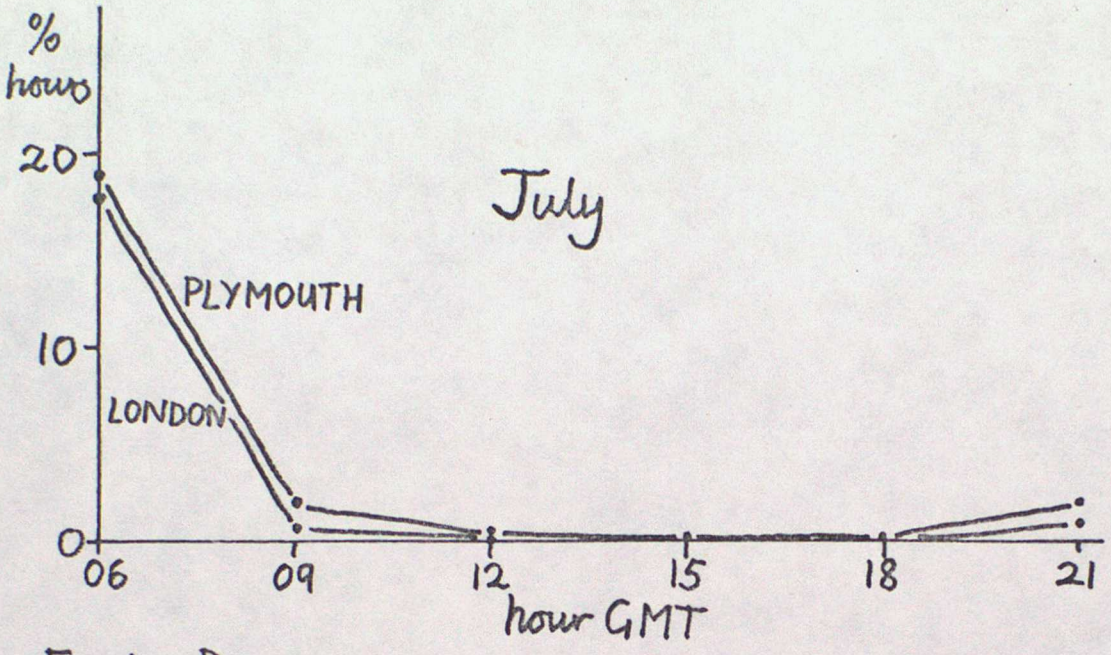

Fig 4. Percentage of hours in July with dewpoint ≥10°C and temperature ≤13°C at Plymouth and London.

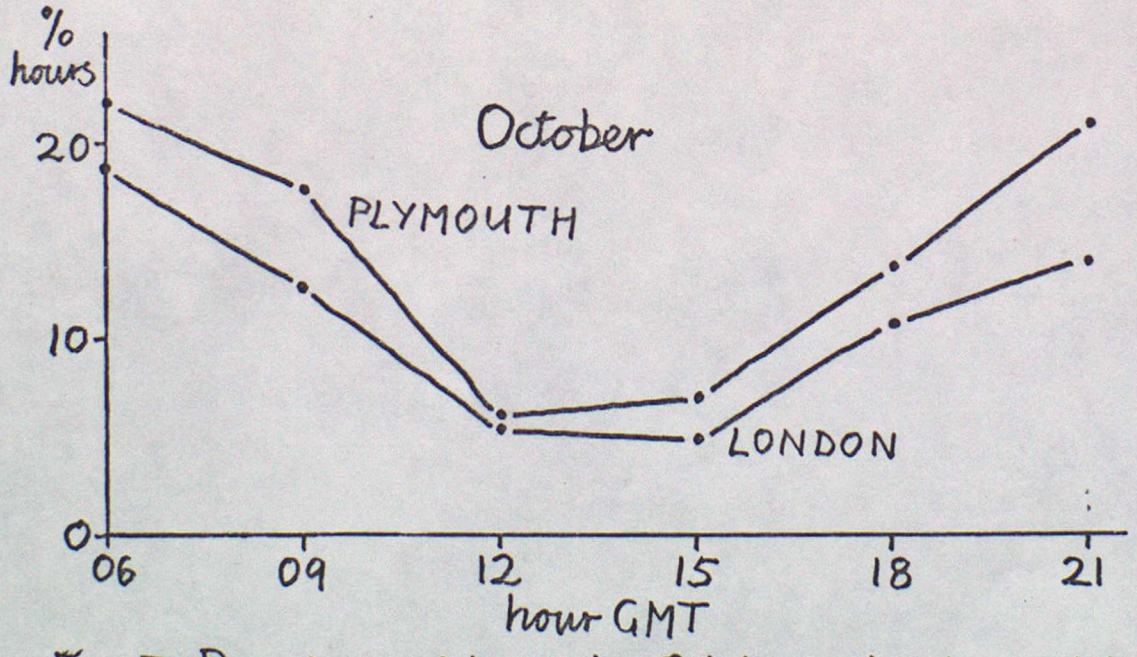

Fig 5. Percentage of hours in October with dewpoint ≥10°C and temperature ≤13°C at Plymouth and London.